

SEQUENCE LISTING

<110> Wyeth Holdings Corporation

<120> METHODS FOR INCREASING NEISSERIA PROTEIN EXPRESSION AND COMPOSITIONS THEREOF

<130> AM100238

<160> 83

<170> PatentIn version 3.2

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<211> 1110

<212> DNA

<213> Neisseria meningitidis (group B)

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 <213> Neisseria meningitidis (group B)

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Gly Leu Pro Arg Leu Glu Pro Arg Ala Ser Asn Ile Leu Glu Gly Leu
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Arg Gly Leu Tyr Ser Ser Glu Arg Ala Arg Gly Ile Leu Glu Ala Arg
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Gly Thr His Arg Leu Tyr Ser Ile Leu Glu Ser Glu Arg Ala Ser Pro
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Pro His Glu Gly Leu Tyr Ser Glu Arg Pro His Glu Ile Leu Glu Gly
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Ala Ser Pro Leu Glu Gly Leu Tyr Gly Leu Gly Leu Tyr Leu Glu Leu
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Gly Leu Gly Leu Asn Ala Ser Pro Val Ala Leu Ser Glu Arg Val Ala
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 Thr His Arg Leu Glu Ala Arg Gly Ala Leu Ala Gly Leu Tyr Ala Arg
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 Ser Pro Leu Glu Ile Leu Glu Gly Leu Ala Arg Gly Gly Leu Tyr Leu
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 <213> Neisseria meningitidis (group B)

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 <213> Neisseria meningitidis (group B)

<400> 4

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Ile Leu Glu Gly Leu Asn Leu Glu Gly Leu Asn Leu Glu Thr His Arg
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Gly Leu Pro Arg Leu Glu Gly Leu Asn Ala Ser Asn Ile Leu Glu Gly
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Leu Asn Gly Leu Asn Pro Arg Gly Leu Asn Val Ala Leu Thr His Arg

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Arg	Ala	Ser	Pro	Pro	His	Glu	Gly	Leu	Tyr	Ser	Glu	Arg	Pro	His	Glu
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Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg Gly His Ile Ser
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Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val Ala Leu Ser Glu
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Arg Val Ala Leu Ala Arg Gly Thr Tyr Arg Ala Ser Pro Ser Glu Arg
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Pro Arg Gly Leu Pro His Glu Ser Glu Arg Gly Leu Tyr Pro His Glu
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His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly Leu Asn Ala Ser Asn
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Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu Ala Thr Tyr Arg Thr
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His Arg Pro Arg Ala Leu Ala His Ile Ser Pro His Glu Val Ala Leu
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Gly Leu Asn Gly Leu Asn Thr His Arg Pro Arg Gly Leu Asn Ser Glu
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Arg Gly Leu Asn Pro Arg Thr His Arg Leu Glu Val Ala Leu Pro Arg
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 Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr Gly Leu Tyr Pro His Glu
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 His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu Ala Leu Tyr Ser His Ile
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 Ser Ala Leu Ala Ala Ser Asn Val Ala Leu Gly Leu Tyr Ala Arg Gly
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 Ala Ser Pro Gly Leu Ala Leu Ala Leu Tyr Ser Gly Leu Tyr Thr His
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 Arg Ala Ser Pro Pro Arg Leu Glu Leu Tyr Ser Ala Ser Asn His Ile
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 Ser Gly Leu Asn Val Ala Leu His Ile Ser Ala Arg Gly Leu Glu Thr
 705 710 715 720
 His Arg Gly Leu Tyr Gly Leu Tyr Thr Tyr Arg Gly Leu Gly Leu Gly
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 Leu Tyr Gly Leu Tyr Leu Glu Ala Ser Asn Leu Glu Ala Leu Ala Leu
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 Glu Ala Leu Ala Ala Leu Ala Gly Leu Asn Leu Glu Ala Ser Pro Leu
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 Glu Ser Glu Arg Gly Leu Ala Ser Asn Ala Leu Ala Ala Ser Pro Leu
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Tyr Ser Thr His Arg Leu Tyr Ser Ala Ser Asn Ser Glu Arg Thr His
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 Arg Thr His Arg Gly Leu Ile Leu Glu Ala Leu Ala Ala Leu Ala Thr
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 His Arg Ala Leu Ala Ser Glu Arg Thr Tyr Arg Ala Arg Gly Pro His
 820 825 830
 Glu Gly Leu Tyr Ala Ser Asn Ala Leu Ala Val Ala Leu Pro Arg Ala
 835 840 845
 Arg Gly Ile Leu Glu Ser Glu Arg Thr Tyr Arg Ala Leu Ala His Ile
 850 855 860
 Ser Gly Leu Tyr Pro His Glu Ala Ser Pro Pro His Glu Ile Leu Glu
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 Gly Leu Ala Arg Gly Gly Leu Tyr Leu Tyr Ser Leu Tyr Ser Gly Leu
 885 890 895
 Tyr Gly Leu Ala Ser Asn Thr His Arg Ser Glu Arg Thr Tyr Arg Ala
 900 905 910
 Ser Pro Gly Leu Asn Ile Leu Glu Ile Leu Glu Ala Leu Ala Gly Leu
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 Tyr Val Ala Leu Ala Ser Pro Thr Tyr Arg Ala Ser Pro Pro His Glu
 930 935 940
 Ser Glu Arg Leu Tyr Ser Ala Arg Gly Thr His Arg Ser Glu Arg Ala
 945 950 955 960
 Leu Ala Ile Leu Glu Val Ala Leu Ser Glu Arg Gly Leu Tyr Ala Leu
 965 970 975
 Ala Thr Arg Pro Leu Glu Leu Tyr Ser Ala Arg Gly Ala Ser Asn Thr
 980 985 990
 His Arg Gly Leu Tyr Ile Leu Glu Gly Leu Tyr Ala Ser Asn Thr Tyr
 995 1000 1005
 Arg Thr His Arg Gly Leu Asn Ile Leu Glu Ala Ser Asn Ala Leu

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 <213> Neisseria meningitidis (group B)

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<212> PRT

<213> Neisseria meningitidis (group B)

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Ser Gly Gln Val Lys Val Thr Lys Val Thr Lys Ala Lys Ser Arg Ile
 35 40 45

Arg Thr Lys Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser
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Glu Asp Leu Gly Asp Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp
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Val Ser Val Ala Gly Gly Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser
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Phe Ile Gly Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val
 100 105 110

Ala Asn Gln Phe Asp Asp Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser
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Asn Asn Asp Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp
 130 135 140

Met Pro Val Ser Val Arg Tyr Asp Ser Pro Glu Phe Ser Gly Phe Ser
 145 150 155 160

Gly Ser Val Gln Phe Val Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr
 165 170 175

Pro Ala Tyr Tyr Thr Lys Asp Thr Asn Asn Asn Leu Thr Leu Val Pro
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Ala Val Val Gly Lys Pro Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn
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Tyr Lys Asn Gly Gly Phe Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Arg

210 215 220
 His Ala Asn Val Gly Arg Asn Ala Phe Glu Leu Phe Leu Ile Gly Ser
 225 230 235 240
 Gly Ser Asp Gln Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val
 245 250 255
 His Arg Leu Thr Gly Gly Tyr Glu Glu Gly Gly Leu Asn Leu Ala Leu
 260 265 270
 Ala Ala Gln Leu Asp Leu Ser Glu Asn Gly Asp Lys Thr Lys Asn Ser
 275 280 285
 Thr Thr Glu Ile Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val
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 Pro Arg Ile Ser Tyr Ala His Gly Phe Asp Phe Ile Glu Arg Gly Lys
 305 310 315 320
 Lys Gly Glu Asn Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr
 325 330 335
 Asp Phe Ser Lys Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys
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 agcgaggatt tgggcgaagg tctgaaagct gtttggcagc ttgagcaaga cgtatccggt 240
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aatgccgcct ccgtcgggtt gcgccacaaa ttc 1113

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<211> 371

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 8

```

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
1           5           10           15

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```

Asn Tyr Gln Leu Gln Leu Thr Glu Ala Gln Ala Ala Asn Gly Gly Ala
20           25           30

```

```

Ser Gly Gln Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr Lys
35           40           45

```

```

Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp Leu
50           55           60

```

```

Gly Glu Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser Val
65           70           75           80

```

```

Ala Gly Gly Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser Phe Ile Gly

```

85										90					95				
Leu	Ala	Gly	Glu	Phe	Gly	Thr	Leu	Arg	Ala	Gly	Arg	Val	Ala	Asn	Gln				
			100					105					110						
Phe	Asp	Asp	Ala	Ser	Gln	Ala	Ile	Asp	Pro	Trp	Asp	Ser	Asn	Asn	Asp				
		115					120					125							
Val	Ala	Ser	Gln	Leu	Gly	Ile	Phe	Lys	Arg	His	Asp	Asp	Met	Pro	Val				
	130					135					140								
Ser	Val	Arg	Tyr	Asp	Ser	Pro	Asp	Phe	Ser	Gly	Phe	Ser	Gly	Ser	Val				
145					150					155					160				
Gln	Phe	Val	Pro	Ile	Gln	Asn	Ser	Lys	Ser	Ala	Tyr	Thr	Pro	Ala	His				
				165					170					175					
Val	Val	Val	Asn	Asn	Lys	Val	Ala	Thr	His	Val	Pro	Ala	Val	Val	Gly				
			180					185					190						
Lys	Pro	Gly	Ser	Asp	Val	Tyr	Tyr	Ala	Gly	Leu	Asn	Tyr	Lys	Asn	Gly				
		195					200					205							
Gly	Phe	Ala	Gly	Asn	Tyr	Ala	Phe	Lys	Tyr	Ala	Arg	His	Ala	Asn	Val				
	210					215					220								
Gly	Arg	Asn	Ala	Phe	Glu	Leu	Phe	Leu	Ile	Gly	Ser	Ala	Thr	Ser	Asp				
225					230					235					240				
Gln	Ala	Lys	Gly	Thr	Asp	Pro	Leu	Lys	Asn	His	Gln	Val	His	Arg	Leu				
				245					250					255					
Thr	Gly	Gly	Tyr	Glu	Glu	Gly	Gly	Leu	Asn	Leu	Ala	Leu	Ala	Ala	Gln				
			260					265					270						
Leu	Asp	Leu	Ser	Glu	Asn	Ala	Asp	Lys	Thr	Lys	Asn	Ser	Thr	Thr	Glu				
		275					280					285							
Ile	Ala	Ala	Thr	Ala	Ser	Tyr	Arg	Phe	Gly	Asn	Ala	Val	Pro	Arg	Ile				
	290					295					300								
Ser	Tyr	Ala	His	Gly	Phe	Asp	Leu	Ile	Glu	Arg	Gly	Lys	Lys	Gly	Glu				
305					310					315					320				

Asn Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser
 325 330 335

Lys Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr
 340 345 350

Gly Ile Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg
 355 360 365

His Lys Phe
 370

<210> 9
 <211> 1107
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 9
 atggatgtca gcctgtacgg cgaaatcaaa gccggcgtgg aaggcaggaa cttccagctg 60
 cagttgaccg aaccgccctc aaagagtcaa cctcaggtaa aagttactaa ggccaaaagc 120
 cgcacacagga cgaaaatcag tgatttcggc tcgtttatcg gctttaaggg gaggtaggat 180
 ttgggcgaag ggctgaaggc tgtttgagcag cttgagcaag acgtatccgt tgccggcggc 240
 ggcgcgaccc agtggggcaa cagggaatcc tttgtcggct tggcaggcga attcgggtacg 300
 ctgcgcgccc gtcgcgttgc gaatcagttt gacgatgcca gccaaagccat tgatccttgg 360
 gacagcaaca atgatgtggc ttcgcaattg ggtattttca aacgccacga cgatatgccg 420
 gtttccgtac gctacgactc tccggacttt tccggtttca gcggcagcgt ccaattcgtt 480
 ccgatccaaa acagcaagtc cgcctatacg ccggctcatt atactaggca gaacaatgct 540
 gatgttttcg ttccggctgt tgcgggcaag cccggatcgg atgtgtatta tgccgggtctg 600
 aattacaaaa atggcggttt tgccgggagc tatgccttta aatatgcgag acacgccaat 660
 gtcggacgtg atgcttttga gttgttcttg ctcggcagca cgagtgatga agccaaaggt 720
 accgatccct tgaaaaacca tcaggtacac cgcctgacgg gcggctatga ggaaggcggc 780
 ttgaatctcg ccttggcggc tcagttggat ttgtctgaaa atggcgacaa agccaaaacc 840
 aaaaacagta cgaccgaaat tgccgccact gcttccctacc gcttcggtaa tgcagttccg 900
 cgcacacagc atgcccattg tttcgacttg atcgaacgcg gtaaaaaagg cgaaaatacc 960
 agctacgac aaatcatcgc cggcggtgat tatgattttt ccaaacgcac ttccgccatc 1020
 gtgtctggcg cttggctgaa acgcaatacc ggcacggcga actacactca aattaatgcc 1080

gcctccgtcg gtttgcgccca caaatcc

1107

<210> 10

<211> 369

<212> PRT

<213> Neisseria meningitidis (group B)

<400> 10

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
 1 5 10 15

Asn Phe Gln Leu Gln Leu Thr Glu Pro Pro Ser Lys Ser Gln Pro Gln
 20 25 30

Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr Lys Ile Ser Asp
 35 40 45

Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp Leu Gly Glu Gly
 50 55 60

Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser Val Ala Gly Gly
 65 70 75 80

Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser Phe Val Gly Leu Ala Gly
 85 90 95

Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn Gln Phe Asp Asp
 100 105 110

Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser Asn Asn Asp Val Ala Ser
 115 120 125

Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro Val Ser Val Arg
 130 135 140

Tyr Asp Ser Pro Asp Phe Ser Gly Phe Ser Gly Ser Val Gln Phe Val
 145 150 155 160

Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr Pro Ala His Tyr Thr Arg
 165 170 175

Gln Asn Asn Ala Asp Val Phe Val Pro Ala Val Val Gly Lys Pro Gly
 180 185 190

Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn Gly Gly Phe Ala
 195 200 205

Gly Ser Tyr Ala Phe Lys Tyr Ala Arg His Ala Asn Val Gly Arg Asp
 210 215 220

Ala Phe Glu Leu Phe Leu Leu Gly Ser Thr Ser Asp Glu Ala Lys Gly
 225 230 235 240

Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu Thr Gly Gly Tyr
 245 250 255

Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln Leu Asp Leu Ser
 260 265 270

Glu Asn Gly Asp Lys Ala Lys Thr Lys Asn Ser Thr Thr Glu Ile Ala
 275 280 285

Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile Ser Tyr
 290 295 300

Ala His Gly Phe Asp Leu Ile Glu Arg Gly Lys Lys Gly Glu Asn Thr
 305 310 315 320

Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser Lys Arg
 325 330 335

Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr Gly Ile
 340 345 350

Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg His Lys
 355 360 365

Phe

<210> 11
 <211> 1110
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 11
 atggatgtca gcctgtacgg cgaaatcaaa gccggcgtgg aaggcaggaa ctaccagctg 60
 caattgactg aacaaccctc aagaactcaa ggtcaaacga gcaatcaggt aaaagttact 120

```

aaggccaaaa gccgcatcag gacgaaaatc agtgatttcg gctcgtttat cggctttaag      180
gggagcgagg atttgggcga aggtctgaag gctgtttggc agcttgagca agacgtatcc      240
gttgccggcg gcggcgcgac ccgttggggc aacagggaat cctttgtcgg cttggcaggc      300
gaattcggca cgctgcgcgc cgcccgcggt gcgaatcagt ttgacgatgc cagcaaagcc      360
attgatcctt gggacagcaa taatgttgtg gcttcgcaat tgggtatattt caaacgccac      420
gacgatatgc cggtttccgt acgctacgac tctccggact tttccggttt cagcggcagc      480
gtccaattcg ttccggctca aaacagcaag tccgcctata agccggctta tgtggatgag      540
aagaaaatgg ttcatgcggc tgttgtcggc aagcccggat cggatgtgta ttatgccggt      600
ctgaattaca aaaatggcgg ttttgccggg aactatgcct ttaaatatgc gaaacacgcc      660
aatgtggggc gtgatgcttt taatttgttc ttgcttgggc gcatcggcga tgatgatgaa      720
gccaaaggta ccgatccctt gaaaaacat caggtacacc gcctgacggg cggctatgag      780
gaaggcggct tgaatctcgc cttggcggct cagttggatt tgtctgaaaa tggcgacaaa      840
acaaaaaaca gtacgaccga aattgccgcc actgcttccct accgcttcgg gaatgcagtt      900
ccacgcatca gctatgccc a tggtttcgac tttatcgaac gcggtaaaaa aggcgaaat      960
accagctacg atcaaatacat cgccggcggt gattatgatt tttccaaacg cacttccgcc     1020
atcgtgtctg gtgcttggct gaaacgcaat accggcatcg gcaactacac tcaaattaat     1080
gccgcctccg tcggtttgcg ccacaaattc                                     1110

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<210> 12
 <211> 370
 <212> PRT
 <213> *Neisseria meningitidis* (group B)

<400> 12

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
 1 5 10 15

Asn Tyr Gln Leu Gln Leu Thr Glu Gln Pro Ser Arg Thr Gln Gly Gln
 20 25 30

Thr Ser Asn Gln Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr
 35 40 45

Lys Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp
 50 55 60

Leu Gly Glu Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser
 65 70 75 80
 Val Ala Gly Gly Gly Ala Thr Arg Trp Gly Asn Arg Glu Ser Phe Val
 85 90 95
 Gly Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn
 100 105 110
 Gln Phe Asp Asp Ala Ser Lys Ala Ile Asp Pro Trp Asp Ser Asn Asn
 115 120 125
 Val Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro
 130 135 140
 Val Ser Val Arg Tyr Asp Ser Pro Asp Phe Ser Gly Phe Ser Gly Ser
 145 150 155 160
 Val Gln Phe Val Pro Ala Gln Asn Ser Lys Ser Ala Tyr Lys Pro Ala
 165 170 175
 Tyr Val Asp Glu Lys Lys Met Val His Ala Ala Val Val Gly Lys Pro
 180 185 190
 Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn Gly Gly Phe
 195 200 205
 Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Lys His Ala Asn Val Gly Arg
 210 215 220
 Asp Ala Phe Asn Leu Phe Leu Leu Gly Arg Ile Gly Asp Asp Asp Glu
 225 230 235 240
 Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu Thr
 245 250 255
 Gly Gly Tyr Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln Leu
 260 265 270
 Asp Leu Ser Glu Asn Gly Asp Lys Thr Lys Asn Ser Thr Thr Glu Ile
 275 280 285
 Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile Ser

290	295	300
Tyr Ala His Gly Phe Asp Phe Ile Glu Arg Gly Lys Lys Gly Glu His		
305	310	315 320
Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser Lys		
	325	330 335
Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr Gly		
	340	345 350
Ile Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg His		
	355	360 365
Lys Phe		
370		

<210> 13
 <211> 1104
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 13
 atggatgtca gcctgtacgg cgaaatcaaa gccggcgtgg aaggcaggaa catccagctg 60
 caattgaccg agcagccctc aaaggetcaa ggtcaaacga acaatcaggt aaaagttact 120
 aaggcaaaaa gccgcatcag gacgaaaatc agcgatttcg gctcgtttat cggctttaag 180
 gggagcgagg atttgggcga agggctgaag gctgtttggc agcttgagca agacgtatcc 240
 gttgccggcg gcggcgcgac ccagtggggc aacaggggaat cctttgtcgg cttggcaggc 300
 gaattcggta cgctgcgcgc cggtcgcgtt gcaaatacgt ttgacgatgc cagccaagcc 360
 attgatcctt gggacagcaa caatgatgtg gcttcgcaat tgggtatttt caaacgccac 420
 gacgatatgc cggtttccgt acgctacgac tctccggact tttccggttt cagcggcagc 480
 gtccaattcg ttccggctca aaacagcaag tccgcctata cgccggctta tgtggatgag 540
 cagagtaagt atcatgcggc tggtgtcggc aagcccggat cggatgtgta ttatgccggt 600
 ctgaattata agaatggcgg ttttgccggg aactatgcct ttaaataatgc gaaacacgcc 660
 aatgtcggac gtgatgcttt tgagttgttc ttgctcggca gcgggagtga tcaagccaaa 720
 ggtaccgatc ccttgaaaaa ccatcaggta caccgcctga cgggcggcta tgaggaaggc 780
 ggcttgaatc tcgccttggc ggctcagttg gatttgtctg aaaatgccga caaaacaaaa 840
 aacagtacga ccgaaattgc cgccactgct tcctaccgct tcggtaatgc agttccacgc 900

atcagctatg cccatggttt cgacttgatc gaacgcggtg aaaaaggcga aaataccagc 960
 tacgatcaaa tcatcgccgg cggttgattat gatttttcca aacgcacttc cgccatcggtg 1020
 tctggcgctt ggctgaaacg caataccggc atcggcaact acactcaaataaat taatgccgcc 1080
 tccgtcggtt tgcgccacaa attc 1104

<210> 14
 <211> 1056
 <212> PRT
 <213> Neisseria meningitidis (group B)

<400> 14

Met Glu Thr Ala Ser Pro Val Ala Leu Ser Glu Arg Leu Glu Thr Tyr
 1 5 10 15

Arg Gly Leu Tyr Gly Leu Ile Leu Glu Leu Tyr Ser Ala Leu Ala Gly
 20 25 30

Leu Tyr Val Ala Leu Gly Leu Gly Leu Tyr Ala Arg Gly Ala Ser Asn
 35 40 45

Ile Leu Glu Gly Leu Asn Leu Glu Gly Leu Asn Leu Glu Thr His Arg
 50 55 60

Gly Leu Gly Leu Asn Pro Arg Ser Glu Arg Leu Tyr Ser Ala Leu Ala
 65 70 75 80

Gly Leu Asn Gly Leu Tyr Gly Leu Asn Thr His Arg Ala Ser Asn Ala
 85 90 95

Ser Asn Gly Leu Asn Val Ala Leu Leu Tyr Ser Val Ala Leu Thr His
 100 105 110

Arg Leu Tyr Ser Ala Leu Ala Leu Tyr Ser Ser Glu Arg Ala Arg Gly
 115 120 125

Ile Leu Glu Ala Arg Gly Thr His Arg Leu Tyr Ser Ile Leu Glu Ser
 130 135 140

Glu Arg Ala Ser Pro Pro His Glu Gly Leu Tyr Ser Glu Arg Pro His
 145 150 155 160

Glu Ile Leu Glu Gly Leu Tyr Pro His Glu Leu Tyr Ser Gly Leu Tyr

165	170	175
Ser Glu Arg Gly Leu Ala Ser Pro Leu Glu Gly Leu Tyr Gly Leu Gly		
180	185	190
Leu Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu Thr Arg Pro		
195	200	205
Gly Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro Val Ala Leu		
210	215	220
Ser Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly Leu Tyr Gly		
225	230	235
Leu Tyr Ala Leu Ala Thr His Arg Gly Leu Asn Thr Arg Pro Gly Leu		
245	250	255
Tyr Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro His Glu Val		
260	265	270
Ala Leu Gly Leu Tyr Leu Glu Ala Leu Ala Gly Leu Tyr Gly Leu Pro		
275	280	285
His Glu Gly Leu Tyr Thr His Arg Leu Glu Ala Arg Gly Ala Leu Ala		
290	295	300
Gly Leu Tyr Ala Arg Gly Val Ala Leu Ala Leu Ala Ala Ser Asn Gly		
305	310	315
Leu Asn Pro His Glu Ala Ser Pro Ala Ser Pro Ala Leu Ala Ser Glu		
325	330	335
Arg Gly Leu Asn Ala Leu Ala Ile Leu Glu Ala Ser Pro Pro Arg Thr		
340	345	350
Arg Pro Ala Ser Pro Ser Glu Arg Ala Ser Asn Ala Ser Asn Ala Ser		
355	360	365
Pro Val Ala Leu Ala Leu Ala Ser Glu Arg Gly Leu Asn Leu Glu Gly		
370	375	380
Leu Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg Gly His Ile		
385	390	395
		400

Ser Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val Ala Leu Ser
405 410 415

Glu Arg Val Ala Leu Ala Arg Gly Thr Tyr Arg Ala Ser Pro Ser Glu
420 425 430

Arg Pro Arg Ala Ser Pro Pro His Glu Ser Glu Arg Gly Leu Tyr Pro
435 440 445

His Glu Ser Glu Arg Gly Leu Tyr Ser Glu Arg Val Ala Leu Gly Leu
450 455 460

Asn Pro His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly Leu Asn Ala
465 470 475 480

Ser Asn Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu Ala Thr Tyr
485 490 495

Arg Thr His Arg Pro Arg Ala Leu Ala Thr Tyr Arg Val Ala Leu Ala
500 505 510

Ser Pro Gly Leu Gly Leu Asn Ser Glu Arg Leu Tyr Ser Thr Tyr Arg
515 520 525

His Ile Ser Ala Leu Ala Ala Leu Ala Val Ala Leu Val Ala Leu Gly
530 535 540

Leu Tyr Leu Tyr Ser Pro Arg Gly Leu Tyr Ser Glu Arg Ala Ser Pro
545 550 555 560

Val Ala Leu Thr Tyr Arg Thr Tyr Arg Ala Leu Ala Gly Leu Tyr Leu
565 570 575

Glu Ala Ser Asn Thr Tyr Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr
580 585 590

Gly Leu Tyr Pro His Glu Ala Leu Ala Gly Leu Tyr Ala Ser Asn Thr
595 600 605

Tyr Arg Ala Leu Ala Pro His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu
610 615 620

Ala Leu Tyr Ser His Ile Ser Ala Leu Ala Ala Ser Asn Val Ala Leu

625		630		635		640									
Gly	Leu	Tyr	Ala	Arg	Gly	Ala	Ser	Pro	Ala	Leu	Ala	Pro	His	Glu	Gly
				645					650					655	
Leu	Leu	Glu	Pro	His	Glu	Leu	Glu	Leu	Glu	Gly	Leu	Tyr	Ser	Glu	Arg
			660					665					670		
Gly	Leu	Tyr	Ser	Glu	Arg	Ala	Ser	Pro	Gly	Leu	Asn	Ala	Leu	Ala	Leu
		675					680					685			
Tyr	Ser	Gly	Leu	Tyr	Thr	His	Arg	Ala	Ser	Pro	Pro	Arg	Leu	Glu	Leu
	690					695					700				
Tyr	Ser	Ala	Ser	Asn	His	Ile	Ser	Gly	Leu	Asn	Val	Ala	Leu	His	Ile
705					710					715				720	
Ser	Ala	Arg	Gly	Leu	Glu	Thr	His	Arg	Gly	Leu	Tyr	Gly	Leu	Tyr	Thr
				725					730					735	
Tyr	Arg	Gly	Leu	Gly	Leu	Gly	Leu	Tyr	Gly	Leu	Tyr	Leu	Glu	Ala	Ser
			740					745					750		
Asn	Leu	Glu	Ala	Leu	Ala	Leu	Glu	Ala	Leu	Ala	Ala	Leu	Ala	Gly	Leu
		755					760					765			
Asn	Leu	Glu	Ala	Ser	Pro	Leu	Glu	Ser	Glu	Arg	Gly	Leu	Ala	Ser	Asn
	770					775					780				
Ala	Leu	Ala	Ala	Ser	Pro	Leu	Tyr	Ser	Thr	His	Arg	Leu	Tyr	Ser	Ala
785					790					795					800
Ser	Asn	Ser	Glu	Arg	Thr	His	Arg	Thr	His	Arg	Gly	Leu	Ile	Leu	Glu
				805					810					815	
Ala	Leu	Ala	Ala	Leu	Ala	Thr	His	Arg	Ala	Leu	Ala	Ser	Glu	Arg	Thr
			820					825					830		
Tyr	Arg	Ala	Arg	Gly	Pro	His	Glu	Gly	Leu	Tyr	Ala	Ser	Asn	Ala	Leu
		835					840					845			
Ala	Val	Ala	Leu	Pro	Arg	Ala	Arg	Gly	Ile	Leu	Glu	Ser	Glu	Arg	Thr
	850					855					860				

Tyr Arg Ala Leu Ala His Ile Ser Gly Leu Tyr Pro His Glu Ala Ser
865 870 875 880

Pro Leu Glu Ile Leu Glu Gly Leu Ala Arg Gly Gly Leu Tyr Leu Tyr
885 890 895

Ser Leu Tyr Ser Gly Leu Tyr Gly Leu Ala Ser Asn Thr His Arg Ser
900 905 910

Glu Arg Thr Tyr Arg Ala Ser Pro Gly Leu Asn Ile Leu Glu Ile Leu
915 920 925

Glu Ala Leu Ala Gly Leu Tyr Val Ala Leu Ala Ser Pro Thr Tyr Arg
930 935 940

Ala Ser Pro Pro His Glu Ser Gly Arg Leu Tyr Ser Ala Arg Gly Thr
945 950 955 960

His Arg Ser Glu Arg Ala Leu Ala Ile Leu Glu Val Ala Leu Ser Glu
965 970 975

Arg Gly Leu Tyr Ala Leu Ala Thr Arg Pro Leu Glu Leu Tyr Ser Ala
980 985 990

Arg Gly Ala Ser Asn Thr His Arg Gly Leu Tyr Ile Leu Glu Gly Leu
995 1000 1005

Tyr Ala Ser Asn Thr Tyr Arg Thr His Arg Gly Leu Asn Ile Leu
1010 1015 1020

Glu Ala Ser Asn Ala Leu Ala Ala Leu Ala Ser Glu Arg Val Ala
1025 1030 1035

Leu Gly Leu Tyr Leu Glu Ala Arg Gly His Ile Ser Leu Tyr Ser
1040 1045 1050

Pro His Glu
1055

<210> 15

<211> 1119

<212> DNA

<213> Neisseria meningitidis (group B)

<400> 15
 atggatgtca gcctatacgg cgaaatcaaa gccggcgtgg aaggcaggaa catccaggcg 60
 caattgaccg agcagcccca agtaactaac ggtgtgcaag gcaatcaggt aaaagttact 120
 aaggccaaaa gccgcatcag gacgaaaatc agcgatttcg gctcgtttat cggctttaag 180
 gggagcggagg atttggggcga agggctgaag gctgtttggc agcttgagca agacgtatcc 240
 gttgccggcg gcggcgcgtc ccagtggggc aacagggaat cctttatcgg cttggcaggc 300
 gaattcggta cgctgcgcgc cggtcgcggt gcaaatcagt ttgacgatgc cagccaagcc 360
 attaatcctt gggacagcaa taatgatgtg gcttcgcaat tgggtatttt caaacgccac 420
 gacgatatgc cggtttccgt acgctacgat tctccggaat tttccggttt cagcggcagc 480
 gtccaattcg ttccggctca aaacagcaag tccgcctata agccggctta ttatactaag 540
 gatacaaaata ataattctac tctcgttccg gctgttgctg gcaagcccgg atcggatgtg 600
 tattatgccg gtctgaatta caaaaatggc ggttttgccg ggaactatgc ctttaaatat 660
 gcgagacacg ccaatgtcgg acgtaatgct tttgagttgt tcttgatcgg cagcgcgacg 720
 agtgatgaag ccaaaggtag cgatcccttg aaaaaccatc aggtacaccg cctgacgggc 780
 ggctatgagg aaggcggctt gaatctcgcc ttggcggctc agttggattt gtctgaaaat 840
 gccgacaaaa caaaaaacag tacgaccgaa attgccgcca ctgcttccta ccgcttcggt 900
 aatgcagttc cgcgcacag ctatgcccat ggtttcgact ttatcgaacg cggtaaaaaa 960
 ggcgaaaata ccagctacga tcaaatcatc gccggcggtg attatgattt ttccaaacgc 1020
 acttccgcca tcgtgtctgg cgcttggtg aaacgcaata ccggcatcgg caactacact 1080
 caaattaatg ccgcctccgt cggtttgccg cacaattc 1119

<210> 16
 <211> 1070
 <212> PRT
 <213> Neisseria meningitidis (group B)

<400> 16

Met Glu Thr Ala Ser Pro Val Ala Leu Ser Glu Arg Leu Glu Thr Tyr
 1 5 10 15

Arg Gly Leu Tyr Gly Leu Ile Leu Glu Leu Tyr Ser Ala Leu Ala Gly
 20 25 30

Leu Tyr Val Ala Leu Gly Leu Gly Leu Tyr Ala Arg Gly Ala Ser Asn
 35 40 45

Ile Leu Glu Gly Leu Asn Ala Leu Ala Gly Leu Asn Leu Glu Thr His
 50 55 60

Arg Gly Leu Gly Leu Asn Pro Arg Gly Leu Asn Val Ala Leu Thr His
 65 70 75 80

Arg Ala Ser Asn Gly Leu Tyr Val Ala Leu Gly Leu Asn Gly Leu Tyr
 85 90 95

Ala Ser Asn Gly Leu Asn Val Ala Leu Leu Tyr Ser Val Ala Leu Thr
 100 105 110

His Arg Leu Tyr Ser Ala Leu Ala Leu Tyr Ser Ser Glu Arg Ala Arg
 115 120 125

Gly Ile Leu Glu Ala Arg Gly Thr His Arg Leu Tyr Ser Ile Leu Glu
 130 135 140

Ser Glu Arg Ala Ser Pro Pro His Glu Gly Leu Tyr Ser Glu Arg Pro
 145 150 155 160

His Glu Ile Leu Glu Gly Leu Tyr Pro His Glu Leu Tyr Ser Gly Leu
 165 170 175

Tyr Ser Glu Arg Gly Leu Ala Ser Pro Leu Glu Gly Leu Tyr Gly Leu
 180 185 190

Gly Leu Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu Thr Arg
 195 200 205

Pro Gly Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro Val Ala
 210 215 220

Leu Ser Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly Leu Tyr
 225 230 235 240

Gly Leu Tyr Ala Leu Ala Ser Glu Arg Gly Leu Asn Thr Arg Pro Gly
 245 250 255

Leu Tyr Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro His Glu
 260 265 270

Ile Leu Glu Gly Leu Tyr Leu Glu Ala Leu Ala Gly Leu Tyr Gly Leu

275		280		285											
Pro	His	Glu	Gly	Leu	Tyr	Thr	His	Arg	Leu	Glu	Ala	Arg	Gly	Ala	Leu
290						295					300				
Ala	Gly	Leu	Tyr	Ala	Arg	Gly	Val	Ala	Leu	Ala	Leu	Ala	Ala	Ser	Asn
305					310					315					320
Gly	Leu	Asn	Pro	His	Glu	Ala	Ser	Pro	Ala	Ser	Pro	Ala	Leu	Ala	Ser
				325					330						335
Glu	Arg	Gly	Leu	Asn	Ala	Leu	Ala	Ile	Leu	Glu	Ala	Ser	Asn	Pro	Arg
			340					345					350		
Thr	Arg	Pro	Ala	Ser	Pro	Ser	Glu	Arg	Ala	Ser	Asn	Ala	Ser	Asn	Ala
		355					360					365			
Ser	Pro	Val	Ala	Leu	Ala	Leu	Ala	Ser	Glu	Arg	Gly	Leu	Asn	Leu	Glu
	370					375					380				
Gly	Leu	Tyr	Ile	Leu	Glu	Pro	His	Glu	Leu	Tyr	Ser	Ala	Arg	Gly	His
385					390					395					400
Ile	Ser	Ala	Ser	Pro	Ala	Ser	Pro	Met	Glu	Thr	Pro	Arg	Val	Ala	Leu
				405					410					415	
Ser	Glu	Arg	Val	Ala	Leu	Ala	Arg	Gly	Thr	Tyr	Arg	Ala	Ser	Pro	Ser
			420					425					430		
Glu	Arg	Pro	Arg	Gly	Leu	Pro	His	Glu	Ser	Glu	Arg	Gly	Leu	Tyr	Pro
		435					440					445			
His	Glu	Ser	Glu	Arg	Gly	Leu	Tyr	Ser	Glu	Arg	Val	Ala	Leu	Gly	Leu
450						455					460				
Asn	Pro	His	Glu	Val	Ala	Leu	Pro	Arg	Ala	Leu	Ala	Gly	Leu	Asn	Ala
465					470					475					480
Ser	Asn	Ser	Glu	Arg	Leu	Tyr	Ser	Ser	Glu	Arg	Ala	Leu	Ala	Thr	Tyr
				485					490					495	
Arg	Leu	Tyr	Ser	Pro	Arg	Ala	Leu	Ala	Thr	Tyr	Arg	Thr	Tyr	Arg	Thr
			500					505					510		

His Arg Leu Tyr Ser Ala Ser Pro Thr His Arg Ala Ser Asn Ala Ser
 515 520 525

Asn Ala Ser Asn Leu Glu Thr His Arg Leu Glu Val Ala Leu Pro Arg
 530 535 540

Ala Leu Ala Val Ala Leu Val Ala Leu Gly Leu Tyr Leu Tyr Ser Pro
 545 550 555 560

Arg Gly Leu Tyr Ser Glu Arg Ala Ser Pro Val Ala Leu Thr Tyr Arg
 565 570 575

Thr Tyr Arg Ala Leu Ala Gly Leu Tyr Leu Glu Ala Ser Asn Thr Tyr
 580 585 590

Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr Gly Leu Tyr Pro His Glu
 595 600 605

Ala Leu Ala Gly Leu Tyr Ala Ser Asn Thr Tyr Arg Ala Leu Ala Pro
 610 615 620

His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu Ala Ala Arg Gly His Ile
 625 630 635 640

Ser Ala Leu Ala Ala Ser Asn Val Ala Leu Gly Leu Tyr Ala Arg Gly
 645 650 655

Ala Ser Asn Ala Leu Ala Pro His Glu Gly Leu Leu Glu Pro His Glu
 660 665 670

Leu Glu Ile Leu Glu Gly Leu Tyr Ser Glu Arg Ala Leu Ala Thr His
 675 680 685

Arg Ser Glu Arg Ala Ser Pro Gly Leu Ala Leu Ala Leu Tyr Ser Gly
 690 695 700

Leu Tyr Thr His Arg Ala Ser Pro Pro Arg Leu Glu Leu Tyr Ser Ala
 705 710 715 720

Ser Asn His Ile Ser Gly Leu Asn Val Ala Leu His Ile Ser Ala Arg
 725 730 735

Gly Leu Glu Thr His Arg Gly Leu Tyr Gly Leu Tyr Thr Tyr Arg Gly

740					745					750					
Leu	Gly	Leu	Gly	Leu	Tyr	Gly	Leu	Tyr	Leu	Glu	Ala	Ser	Asn	Leu	Glu
		755					760					765			
Ala	Leu	Ala	Leu	Glu	Ala	Leu	Ala	Ala	Leu	Ala	Gly	Leu	Asn	Leu	Glu
	770					775					780				
Ala	Ser	Pro	Leu	Glu	Ser	Glu	Arg	Gly	Leu	Ala	Ser	Asn	Ala	Leu	Ala
	785					790					795				800
Ala	Ser	Pro	Leu	Tyr	Ser	Thr	His	Arg	Leu	Tyr	Ser	Ala	Ser	Asn	Ser
			805						810					815	
Glu	Arg	Thr	His	Arg	Thr	His	Arg	Gly	Leu	Ile	Leu	Glu	Ala	Leu	Ala
			820					825					830		
Ala	Leu	Ala	Thr	His	Arg	Ala	Leu	Ala	Ser	Glu	Arg	Thr	Tyr	Arg	Ala
		835					840					845			
Arg	Gly	Pro	His	Glu	Gly	Leu	Tyr	Ala	Ser	Asn	Ala	Leu	Ala	Val	Ala
	850					855					860				
Leu	Pro	Arg	Ala	Arg	Gly	Ile	Leu	Glu	Ser	Glu	Arg	Thr	Tyr	Arg	Ala
	865					870					875				880
Leu	Ala	His	Ile	Ser	Gly	Leu	Tyr	Pro	His	Glu	Ala	Ser	Pro	Pro	His
				885					890					895	
Glu	Ile	Leu	Glu	Gly	Leu	Ala	Arg	Gly	Gly	Leu	Tyr	Leu	Tyr	Ser	Leu
			900					905						910	
Tyr	Ser	Gly	Leu	Tyr	Gly	Leu	Ala	Ser	Asn	Thr	His	Arg	Ser	Glu	Arg
		915					920					925			
Thr	Tyr	Arg	Ala	Ser	Pro	Gly	Leu	Asn	Ile	Leu	Glu	Ile	Leu	Glu	Ala
		930				935					940				
Leu	Ala	Gly	Leu	Tyr	Val	Ala	Leu	Ala	Ser	Pro	Thr	Tyr	Arg	Ala	Ser
	945					950					955				960
Pro	Pro	His	Glu	Ser	Glu	Arg	Leu	Tyr	Ser	Ala	Arg	Gly	Thr	His	Arg
				965					970					975	

Ser Glu Arg Ala Leu Ala Ile Leu Glu Val Ala Leu Ser Glu Arg Gly
 980 985 990

Leu Tyr Ala Leu Ala Thr Arg Pro Leu Glu Leu Tyr Ser Ala Arg Gly
 995 1000 1005

Ala Ser Asn Thr His Arg Gly Leu Tyr Ile Leu Glu Gly Leu Tyr
 1010 1015 1020

Ala Ser Asn Thr Tyr Arg Thr His Arg Gly Leu Asn Ile Leu Glu
 1025 1030 1035

Ala Ser Asn Ala Leu Ala Ala Leu Ala Ser Glu Arg Val Ala Leu
 1040 1045 1050

Gly Leu Tyr Leu Glu Ala Arg Gly His Ile Ser Leu Tyr Ser Pro
 1055 1060 1065

His Glu
 1070

<210> 17
 <211> 1113
 <212> DNA
 <213> Neisseria meningitidis (group B)

<400> 17
 atggatgtca gcctatacgg cgaaatcaaa gccggcggtgg aaggcaggaa ctaccagctg 60
 caattgactg aagcacaagc cgctaacggt ggagcgagcg gtcaggtaaa agttactaag 120
 gccaaaagcc gcatcaggac gaaaatcagt gatttcggct cgtttatcgg ctttaagggg 180
 agtgaggatt tgggcgacgg gctgaaggct gtttggcagc ttgagcaaga cgtatccggt 240
 gccggcgggc gcgcgaccca gtggggcaac agggaaatcct ttatcggctt ggcaggcgaa 300
 ttcgggtacgc tgcgcgccgg tcgcgttgcg aatcagtttg acgatgccag ccaagccatt 360
 gatccttggg acagcaataa tgatgtggct tcgcaattgg gtattttcaa acgccacgac 420
 gacatgccgg tttccgtacg ctacgattcc cccgaatttt ccggtttcag cggcagcggt 480
 caattcggtc cgatccaaaa cagcaagtcc gcctatacgc cggcttatta tactaaggat 540
 acaaacaata atcttactct cgttccgggt gttgtcggca agcccggatc ggatgtgtat 600
 tatgccggtc tgaattacaa aaatggcggt tttgccggga actatgcctt taaatatgcg 660
 agacacgcca atgtcggacg taatgctttt gagttgttct tgatcggcag cgggagtgat 720

```

caagccaaag gtaccgatcc cttgaaaaac catcaggtag accgtctgac gggcggctat      780
gaggaaggcg gcttgaatct cgccttggcg gctcagttgg atttgtctga aaatggcgac      840
aaaacaaaaa acagtacgac cgaaattgcc gccactgctt cctaccgctt cggtaatgca      900
gttccacgca tcagctatgc ccatggtttc gactttatcg aacgcggtaa aaaaggcgaa      960
aataccagct acgatcaaat catcgccggc gttgattatg atttttccaa acgcacttcc     1020
gccatcgtgt ctggcgcttg gctgaagcgc aataccggca tcggcaacta cactcaaatt     1080
aatgccgcct ccgtcggttt gcgccacaaa ttc                                  1113

```

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<210> 18
<211> 371
<212> PRT
<213> Neisseria meningitidis (group B)

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```

<400> 18

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```

Met Asp Val Ser Leu Tyr Gly Glu Ile Lys Ala Gly Val Glu Gly Arg
1           5           10          15

```

```

Asn Tyr Gln Leu Gln Leu Thr Glu Ala Gln Ala Ala Asn Gly Gly Ala
20          25          30

```

```

Ser Gly Gln Val Lys Val Thr Lys Ala Lys Ser Arg Ile Arg Thr Lys
35          40          45

```

```

Ile Ser Asp Phe Gly Ser Phe Ile Gly Phe Lys Gly Ser Glu Asp Leu
50          55          60

```

```

Gly Asp Gly Leu Lys Ala Val Trp Gln Leu Glu Gln Asp Val Ser Val
65          70          75          80

```

```

Ala Gly Gly Gly Ala Thr Gln Trp Gly Asn Arg Glu Ser Phe Ile Gly
85          90          95

```

```

Leu Ala Gly Glu Phe Gly Thr Leu Arg Ala Gly Arg Val Ala Asn Gln
100         105         110

```

```

Phe Asp Asp Ala Ser Gln Ala Ile Asp Pro Trp Asp Ser Asn Asn Asp
115         120         125

```

```

Val Ala Ser Gln Leu Gly Ile Phe Lys Arg His Asp Asp Met Pro Val
130         135         140

```

Ser Val Arg Tyr Asp Ser Pro Glu Phe Ser Gly Phe Ser Gly Ser Val
 145 150 155 160
 Gln Phe Val Pro Ile Gln Asn Ser Lys Ser Ala Tyr Thr Pro Ala Tyr
 165 170 175
 Tyr Thr Lys Asp Thr Asn Asn Asn Leu Thr Leu Val Pro Ala Val Val
 180 185 190
 Gly Lys Pro Gly Ser Asp Val Tyr Tyr Ala Gly Leu Asn Tyr Lys Asn
 195 200 205
 Gly Gly Phe Ala Gly Asn Tyr Ala Phe Lys Tyr Ala Arg His Ala Asn
 210 215 220
 Val Gly Arg Asn Ala Phe Glu Leu Phe Leu Ile Gly Ser Gly Ser Asp
 225 230 235 240
 Gln Ala Lys Gly Thr Asp Pro Leu Lys Asn His Gln Val His Arg Leu
 245 250 255
 Thr Gly Gly Tyr Glu Glu Gly Gly Leu Asn Leu Ala Leu Ala Ala Gln
 260 265 270
 Leu Asp Leu Ser Glu Asn Gly Asp Lys Thr Lys Asn Ser Thr Thr Glu
 275 280 285
 Ile Ala Ala Thr Ala Ser Tyr Arg Phe Gly Asn Ala Val Pro Arg Ile
 290 295 300
 Ser Tyr Ala His Gly Phe Asp Phe Ile Glu Arg Gly Lys Lys Gly Glu
 305 310 315 320
 Asn Thr Ser Tyr Asp Gln Ile Ile Ala Gly Val Asp Tyr Asp Phe Ser
 325 330 335
 Lys Arg Thr Ser Ala Ile Val Ser Gly Ala Trp Leu Lys Arg Asn Thr
 340 345 350
 Gly Ile Gly Asn Tyr Thr Gln Ile Asn Ala Ala Ser Val Gly Leu Arg
 355 360 365
 His Lys Phe

370

<210> 19
 <211> 1110
 <212> DNA
 <213> *Neisseria meningitidis* (group B)

<400> 19
 atggatgtca gcctgtacgg cgaaatcaaa gccggcgtgg aaggcaacaa cattcagctg 60
 caattgaccg aaccaccctc aaaagggtcag acgggcaata aagttactaa gggcaaaaagc 120
 cgcacacagga cgaaaatcaa cgatttcggc tcgtttatcg gctttaaggg gagcgaggat 180
 ttgggcgaag ggctgaaggc tgtttggcag cttgagcaag acgtatccgt tgccggcggc 240
 ggcgcgaccc agtggggcaa cagggaatcc tttatcggct tggcaggcga attcggcacg 300
 ctgcgcgccg gtcgcgttgc aaatcagttt gacgatgcca gccaaagccat tgatccttgg 360
 gacagcaaca atgatgtggc ttcgcaattg ggtattttca aacgccacga cgatatgccg 420
 gtttctgtac gctacgactc tccggacttt tccggtttca gcggcagcgt ccaattcgtt 480
 ccggcccaaa acagcaaadc cgcctatacg ccggctactt atactgtgga tagtagtggt 540
 gttgttactc ccgttcctgc tgttgtcggc aagcccggat cggatgtgta ttatgccggt 600
 ctgaattaca aaaatggcgg ttttgccggg aactatgcct ttaaatacgc gaaacacgcc 660
 aatgtggggc gtgatgcttt taatttggtc ttgcttgggc gcatcggcga ggatgatgaa 720
 gccaaaggta ccgatccctt gaaaaacat caggtaacac gcctgacggg cggctatgag 780
 gaaggcggct tgaatctcgc cttggcggct cagttggatt tgtctgaaaa tggcgacaaa 840
 accaaaaaca gtacgaccga aattgccgcc actgcttcct accgcttcgg gaatgcagtt 900
 ccacgcatca gctatgccca tggtttcgac tttatcgaac gcggtaaaaa aggcgaacat 960
 accagctacg atcaaatac cgccggcggt gattatgatt tttccaaacg cacttcgcc 1020
 atcgtgtctg gtgcttggct gaaacgcaat accggcatcg gcaactacac tcaaattaat 1080
 gccgcctccg tcggtttgcg ccacaaattc 1110

<210> 20
 <211> 1060
 <212> PRT
 <213> *Neisseria meningitidis* (group B)

<400> 20

Met Glu Thr Ala Ser Pro Val Ala Leu Ser Glu Arg Leu Glu Thr Tyr
 1 5 10 15

Arg Gly Leu Tyr Gly Leu Ile Leu Glu Leu Tyr Ser Ala Leu Ala Gly
 20 25 30

Leu Tyr Val Ala Leu Gly Leu Gly Leu Tyr Ala Ser Asn Ala Ser Asn
 35 40 45

Ile Leu Glu Gly Leu Asn Leu Glu Gly Leu Asn Leu Glu Thr His Arg
 50 55 60

Gly Leu Pro Arg Pro Arg Ser Glu Arg Leu Tyr Ser Gly Leu Tyr Gly
 65 70 75 80

Leu Asn Thr His Arg Gly Leu Tyr Ala Ser Asn Leu Tyr Ser Val Ala
 85 90 95

Leu Thr His Arg Leu Tyr Ser Gly Leu Tyr Leu Tyr Ser Ser Glu Arg
 100 105 110

Ala Arg Gly Ile Leu Glu Ala Arg Gly Thr His Arg Leu Tyr Ser Ile
 115 120 125

Leu Glu Ala Ser Asn Ala Ser Pro Pro His Glu Gly Leu Tyr Ser Glu
 130 135 140

Arg Pro His Glu Ile Leu Glu Gly Leu Tyr Pro His Glu Leu Tyr Ser
 145 150 155 160

Gly Leu Tyr Ser Glu Arg Gly Leu Ala Ser Pro Leu Glu Gly Leu Tyr
 165 170 175

Gly Leu Gly Leu Tyr Leu Glu Leu Tyr Ser Ala Leu Ala Val Ala Leu
 180 185 190

Thr Arg Pro Gly Leu Asn Leu Glu Gly Leu Gly Leu Asn Ala Ser Pro
 195 200 205

Val Ala Leu Ser Glu Arg Val Ala Leu Ala Leu Ala Gly Leu Tyr Gly
 210 215 220

Leu Tyr Gly Leu Tyr Ala Leu Ala Thr His Arg Gly Leu Asn Thr Arg
 225 230 235 240

Pro Gly Leu Tyr Ala Ser Asn Ala Arg Gly Gly Leu Ser Glu Arg Pro

	245		250		255
His Glu Ile	Leu Glu Gly Leu Tyr	Leu Glu Ala Leu Ala Gly Leu Tyr			
	260	265		270	
Gly Leu Pro	His Glu Gly Leu Tyr Thr His Arg Leu Glu Ala Arg Gly				
	275	280		285	
Ala Leu Ala Gly Leu Tyr	Ala Arg Gly Val Ala Leu Ala Leu Ala Ala				
	290	295		300	
Ser Asn Gly Leu Asn	Pro His Glu Ala Ser Pro Ala Ser Pro Ala Leu				
	305	310		315	320
Ala Ser Glu Arg Gly Leu Asn Ala Leu Ala Ile Leu Glu Ala Ser Pro					
	325	330		335	
Pro Arg Thr Arg Pro Ala Ser Pro Ser Glu Arg Ala Ser Asn Ala Ser					
	340	345		350	
Asn Ala Ser Pro Val Ala Leu Ala Leu Ala Ser Glu Arg Gly Leu Asn					
	355	360		365	
Leu Glu Gly Leu Tyr Ile Leu Glu Pro His Glu Leu Tyr Ser Ala Arg					
	370	375		380	
Gly His Ile Ser Ala Ser Pro Ala Ser Pro Met Glu Thr Pro Arg Val					
	385	390		395	400
Ala Leu Ser Glu Arg Val Ala Leu Ala Arg Gly Thr Tyr Arg Ala Ser					
	405	410		415	
Pro Ser Glu Arg Pro Arg Ala Ser Pro Pro His Glu Ser Glu Arg Gly					
	420	425		430	
Leu Tyr Pro His Glu Ser Glu Arg Gly Leu Tyr Ser Glu Arg Val Ala					
	435	440		445	
Leu Gly Leu Asn Pro His Glu Val Ala Leu Pro Arg Ala Leu Ala Gly					
	450	455		460	
Leu Asn Ala Ser Asn Ser Glu Arg Leu Tyr Ser Ser Glu Arg Ala Leu					
	465	470		475	480

Ala Thr Tyr Arg Thr His Arg Pro Arg Ala Leu Ala Thr His Arg Thr
 485 490 495
 Tyr Arg Thr His Arg Val Ala Leu Ala Ser Pro Ser Glu Arg Ser Glu
 500 505 510
 Arg Gly Leu Tyr Val Ala Leu Val Ala Leu Thr His Arg Pro Arg Val
 515 520 525
 Ala Leu Pro Arg Ala Leu Ala Val Ala Leu Val Ala Leu Gly Leu Tyr
 530 535 540
 Leu Tyr Ser Pro Arg Gly Leu Tyr Ser Glu Arg Ala Ser Pro Val Ala
 545 550 555 560
 Leu Thr Tyr Arg Thr Tyr Arg Ala Leu Ala Gly Leu Tyr Leu Glu Ala
 565 570 575
 Ser Asn Thr Tyr Arg Leu Tyr Ser Ala Ser Asn Gly Leu Tyr Gly Leu
 580 585 590
 Tyr Pro His Glu Ala Leu Ala Gly Leu Tyr Ala Ser Asn Thr Tyr Arg
 595 600 605
 Ala Leu Ala Pro His Glu Leu Tyr Ser Thr Tyr Arg Ala Leu Ala Leu
 610 615 620
 Tyr Ser His Ile Ser Ala Leu Ala Ala Ser Asn Val Ala Leu Gly Leu
 625 630 635 640
 Tyr Ala Arg Gly Ala Ser Pro Ala Leu Ala Pro His Glu Ala Ser Asn
 645 650 655
 Leu Glu Pro His Glu Leu Glu Leu Glu Gly Leu Tyr Ala Arg Gly Ile
 660 665 670
 Leu Glu Gly Leu Tyr Gly Leu Ala Ser Pro Ala Ser Pro Gly Leu Ala
 675 680 685
 Leu Ala Leu Tyr Ser Gly Leu Tyr Thr His Arg Ala Ser Pro Pro Arg
 690 695 700
 Leu Glu Leu Tyr Ser Ala Ser Asn His Ile Ser Gly Leu Asn Val Ala

705		710		715		720
Leu His Ile Ser	Ala Arg Gly Leu Glu Thr	His Arg Gly Leu Tyr Gly				
	725	730			735	
Leu Tyr Thr Tyr	Arg Gly Leu Gly Leu Gly Leu Tyr Gly	Leu Tyr Leu				
	740	745			750	
Glu Ala Ser Asn	Leu Glu Ala Leu Ala Leu Glu Ala	Leu Ala Ala Leu				
	755	760			765	
Ala Gly Leu Asn	Leu Glu Ala Ser Pro Leu Glu Ser Glu Arg Gly	Leu				
	770	775			780	
Ala Ser Asn Gly	Leu Tyr Ala Ser Pro Leu Tyr Ser Thr His Arg	Leu				
	785	790			795	800
Tyr Ser Ala Ser	Asn Ser Glu Arg Thr His Arg Thr His Arg Gly	Leu				
	805	810			815	
Ile Leu Glu Ala	Leu Ala Ala Leu Ala Thr His Arg Ala	Leu Ala Ser				
	820	825			830	
Glu Arg Thr Tyr	Arg Ala Arg Gly Pro His Glu Gly Leu Tyr Ala Ser					
	835	840			845	
Asn Ala Leu Ala	Val Ala Leu Pro Arg Ala Arg Gly Ile Leu Glu Ser					
	850	855			860	
Glu Arg Thr Tyr	Arg Ala Leu Ala His Ile Ser Gly Leu Tyr Pro His					
	865	870			875	880
Glu Ala Ser Pro	Pro His Glu Ile Leu Glu Gly Leu Ala Arg Gly Gly					
	885	890			895	
Leu Tyr Leu Tyr	Ser Leu Tyr Ser Gly Leu Tyr Gly Leu His Ile Ser					
	900	905			910	
Thr His Arg Ser	Glu Arg Thr Tyr Arg Ala Ser Pro Gly Leu Asn Ile					
	915	920			925	
Leu Glu Ile Leu	Glu Ala Leu Ala Gly Leu Tyr Val Ala Leu Ala Ser					
	930	935			940	

Pro Thr Tyr Arg Ala Ser Pro Pro His Glu Ser Glu Arg Leu Tyr Ser
945 950 955 960

Ala Arg Gly Thr His Arg Ser Glu Arg Ala Leu Ala Ile Leu Glu Val
965 970 975

Ala Leu Ser Glu Arg Gly Leu Tyr Ala Leu Ala Thr Arg Pro Leu Glu
980 985 990

Leu Tyr Ser Ala Arg Gly Ala Ser Asn Thr His Arg Gly Leu Tyr Ile
995 1000 1005

Leu Glu Gly Leu Tyr Ala Ser Asn Thr Tyr Arg Thr His Arg Gly
1010 1015 1020

Leu Asn Ile Leu Glu Ala Ser Asn Ala Leu Ala Ala Leu Ala Ser
1025 1030 1035

Glu Arg Val Ala Leu Gly Leu Tyr Leu Glu Ala Arg Gly His Ile
1040 1045 1050

Ser Leu Tyr Ser Pro His Glu
1055 1060

<210> 21
<211> 45
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 21
cgcgagatct catatggatg tcagcctata cggcgaaatc aaagc 45

<210> 22
<211> 46
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 22
cgtcggtttg cgccacaaat tctaagtagt gactgaagat ctgcgc 46

<210> 23
<211> 70
<212> DNA
<213> Neisseria meningitidis (group B)

<400> 23
cgcgagatct catatggatg tcagcctata cggcgaaatc aaagccggcg tggaaggcag 60

gaactaccag

70

<210> 24

<211> 1110

<212> DNA

<213> *Neisseria meningitidis* (group B)

<400> 24

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atggatgtca gcctgtacgg cgaaatcaaa gccggcgtgg aaggcaggaa catccagctg      60
caattgaccg agcagccctc aaaggctcaa ggtcaaacga acaatcaggt aaaagttact      120
aaggcaaaaa gccgcatcag gacgaaaatc agcgatttcg gctcgtttat cggctttaag      180
gggagtgagg atttgggcga cgagctgaag gctgtttggc agcttgagca agacgtatcc      240
gttgccggcg gcggcgcgac ccgttggggc aataggggaat cctttgtcgg cttggcaggc      300
gaattcggca cgctgcgcgc cggccgcggt gcgaatcagt ttgacgatgc cagccaagcc      360
attgatcctt gggacagcaa caatgatgtg gcttcgcaat tgggtatattt caaacgccac      420
gacgatatgc cggtttccgt. acgctacgac tctccggact tttccggttt cagcggcagc      480
gtccaattcg ttccgatcca aaacagcaag tccgcctata agccggctta tgtggatgag      540
aagaagatgg ttcatgcggc tgttgtcggc aagcccggat cggatgtgta ttatgccggt      600
ctgaattaca aaaatggcgg atttgccggg agctatgcct ttaaataatgc gagacacgcc      660
aatgtcggac gtgatgcttt tgagttgttc ttgctcggca gcacgagtga tgaagccaaa      720
ggtaccgatc ccttgaaaaa ccatcaggta caccgcctga cgggcggcta tgaggaaggc      780
ggcttgaatc tcgccttggc ggcccagttg gatttgtctg aaaatggcga caaagccaaa      840
acaaaaaaca gtacgaccga aattgccgcg actgcttcct accgcttcgg taatgcagtt      900
ccacgcatca gctatgcca tggtttcgac ttgatcgaac gcggtaaaaa aggcgaaaat      960
accagctacg atcaaatcat cgccggcggt gattatgatt tttccaaacg cacttccgcc     1020
atcgtgtctg gcgcttggct gaaacgcaat accggcatcg gcaactacac tcaaattaat     1080
gccgcctccg tcggtttgcg ccacaaattc                                     1110

```

<210> 25

<211> 370

<212> PRT

<213> *Neisseria meningitidis* (group B)

<400> 25

```

Met Ala Val Ser Leu Thr Gly Gly Ile Leu Ala Gly Val Gly Gly Ala
1           5           10          15

```

Ala Ile Gly Leu Gly Leu Thr Gly Gly Pro Ser Leu Ala Gly Gly Gly
20 25 30

Thr Ala Ala Gly Val Leu Val Thr Leu Ala Leu Ser Ala Ile Ala Thr
35 40 45

Leu Ile Ser Ala Pro Gly Ser Pro Ile Gly Pro Leu Gly Ser Gly Ala
50 55 60

Leu Gly Ala Gly Leu Leu Ala Val Thr Gly Leu Gly Gly Ala Val Ser
65 70 75 80

Val Ala Gly Gly Gly Ala Thr Ala Thr Gly Ala Ala Gly Ser Pro Val
85 90 95

Gly Leu Ala Gly Gly Pro Gly Thr Leu Ala Ala Gly Ala Val Ala Ala
100 105 110

Gly Pro Ala Ala Ala Ser Gly Ala Ile Ala Pro Thr Ala Ser Ala Ala
115 120 125

Ala Val Ala Ser Gly Leu Gly Ile Pro Leu Ala His Ala Ala Met Pro
130 135 140

Val Ser Val Ala Thr Ala Ser Pro Ala Pro Ser Gly Pro Ser Gly Ser
145 150 155 160

Val Gly Pro Val Pro Ile Gly Ala Ser Leu Ser Ala Thr Leu Pro Ala
165 170 175

Thr Val Ala Gly Leu Leu Met Val His Ala Ala Val Val Gly Leu Pro
180 185 190

Gly Ser Ala Val Thr Thr Ala Gly Leu Ala Thr Leu Ala Gly Gly Pro
195 200 205

Ala Gly Ser Thr Ala Pro Leu Thr Ala Ala His Ala Ala Val Gly Ala
210 215 220

Ala Ala Pro Gly Leu Pro Leu Leu Gly Ser Thr Ser Ala Gly Ala Leu
225 230 235 240

Gly Thr Ala Pro Leu Leu Ala His Gly Val His Ala Leu Thr Gly Gly
 245 250 255

Thr Gly Gly Gly Gly Leu Ala Leu Ala Leu Ala Ala Gly Leu Ala Leu
 260 265 270

Ser Gly Ala Gly Ala Leu Ala Leu Thr Leu Ala Ser Thr Thr Gly Ile
 275 280 285

Ala Ala Thr Ala Ser Thr Ala Pro Gly Ala Ala Val Pro Ala Ile Ser
 290 295 300

Thr Ala His Gly Pro Ala Leu Ile Gly Ala Gly Leu Leu Gly Gly Ala
 305 310 315 320

Thr Ser Thr Ala Gly Ile Ile Ala Gly Val Ala Thr Ala Pro Ser Leu
 325 330 335

Ala Thr Ser Ala Ile Val Ser Gly Ala Thr Leu Leu Ala Ala Thr Gly
 340 345 350

Ile Gly Ala Thr Thr Gly Ile Ala Ala Ala Ser Val Gly Leu Ala His
 355 360 365

Leu Pro
 370

<210> 26
 <211> 10
 <212> PRT
 <213> Neisseria meningitidis (group B)

<220>
 <221> misc_feature
 <222> (5)..(5)
 <223> Xaa can be any naturally occurring amino acid

<400> 26

Ala Asp Ile Gly Xaa Gly Leu Ala Asp Ala
 1 5 10

<210> 27
 <211> 10
 <212> PRT
 <213> Neisseria meningitidis (group B)

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 27

Ile Gly Xaa Gly Leu Ala Asp Ala Leu Thr
1 5 10

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Ser Leu Thr Leu Xaa Xaa Ser Xaa Xaa Xaa Asn Xaa Xaa Leu Xaa Leu
35 40 45

Xaa Ala Gln Gly Ala Glu Lys Thr Xaa Xaa Xaa Gly Asp Ser Leu Asn
50 55 60

Thr Gly Lys Leu Lys Asn Asp Lys Xaa Ser Arg Phe Asp Phe Xaa Xaa
65 70 75 80

Xaa Ile Xaa Val Asp Gly Xaa Xaa Ile Thr Leu Xaa Ser Gly Glu Phe
85 90 95

Gln Xaa Tyr Lys Gln Xaa His Ser Ala Xaa Xaa Ala Leu Gln Xaa Glu
 100 105 110
 Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Arg Xaa
 115 120 125
 Phe Xaa Xaa Xaa Xaa Xaa Xaa Gly Glu His Thr Xaa Phe Xaa Xaa Leu
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 Pro Xaa Xaa Xaa Ala Xaa Tyr Xaa Gly Xaa Ala Phe Xaa Ser Asp Asp
 145 150 155 160
 Xaa Xaa Gly Xaa Leu Xaa Tyr Xaa Ile Asp Phe Xaa Xaa Lys Gln Gly
 165 170 175
 Xaa Gly Xaa Ile Glu His Leu Lys Xaa Pro Glu Xaa Asn Val Xaa Leu
 180 185 190
 Ala Xaa Xaa Xaa Xaa Lys Xaa Asp Glu Lys Xaa His Ala Val Ile Xaa
 195 200 205
 Gly Xaa Xaa Xaa Tyr Xaa Xaa Xaa Glu Lys Gly Xaa Tyr Xaa Leu Xaa
 210 215 220
 Xaa Xaa Gly Xaa Xaa Ala Gln Glu Xaa Ala Gly Xaa Ala Xaa Val Xaa
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35 40 45

Xaa Ala Gln Gly Ala Glu Lys Thr Xaa Xaa Xaa Gly Asp Ser Leu Asn
50 55 60

Thr Gly Lys Leu Lys Asn Asp Lys Xaa Ser Arg Phe Asp Phe Xaa Xaa
65 70 75 80

Xaa Ile Xaa Val Asp Gly Gln Xaa Ile Thr Leu Xaa Ser Gly Glu Phe
 85 90 95

Gln Ile Tyr Lys Gln Xaa His Ser Ala Val Val Ala Leu Gln Ile Glu
 100 105 110

Lys Ile Asn Asn Pro Asp Lys Ile Asp Ser Leu Ile Asn Gln Arg Ser
 115 120 125

Phe Leu Val Ser Gly Leu Gly Gly Glu His Thr Ala Phe Asn Gln Leu
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Pro Xaa Gly Lys Ala Glu Tyr His Gly Lys Ala Phe Ser Ser Asp Asp
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Xaa Gly Xaa Ile Glu His Leu Lys Thr Pro Glu Gln Asn Val Glu Leu
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Ala Xaa Ala Glu Leu Lys Ala Asp Glu Lys Ser His Ala Val Ile Leu
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Gly Asp Thr Arg Tyr Gly Xaa Glu Glu Lys Gly Thr Tyr His Leu Ala
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 Asp Ala Gly Gly Lys Leu Thr Tyr Thr Ile Asp Phe Ala Ala Lys Gln
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